### PATENT COOPERATION TREATY

### PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference O.Z. 6241-WO International application No. PCT/EP2004/050992			FOR FURTHER ACTIO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)			
			International filing date (day/n 02.06.2004	nonth/year)	Priority date (day/month/year) 28.07.2003		
	tional Pater 220/10	nt Classification (IPC) o	or both national classification and IF	PC .			
opplica DEGL	Int JSSA AG						
1. T	This intern Authority a	ational preliminary e and is transmitted to	examination report has been pro the applicant according to Artic	epared by thi le 36.	s International Preliminary Examining		
2. 7	This REPORT consists of a total of 5 sheets, including this cover sheet.						
٥	beer	amended and are t	npanied by ANNEXES, i.e. shee the basis for this report and/or s ction 607 of the Administrative I	heets contain	scription, claims and/or drawings which have ning rectifications made before this Authority ander the PCT).		
-	These anr	nexes consist of a to	tal of sheets.				
			•				
3.	This report contains indications relating to the following items:						
1	I 🖾	Basis of the opinio	n				
		Priority					
			· -	ity, inventive	step and industrial applicability		
	V 🛭			_	elty, inventive step or industrial applicability;		
,	VI 🗆	Certain documents		10111			
	VII 🗆		the international application		•		
VII  Certain defects in the international application.  VIII Certain observations on the international application.							
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# IAP5 Rec'd PCT/PTO 30 JAN 2006 10/566371

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2004/050992

i.	Basis	of the	report
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1. With regard to the **elements** of the international application (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):

	Des	cription, Pages						
	1, 2,	5-12	as originally filed					
3, 4			received on 24.05.2005 with letter of 20.05.2005					
	Clair	ms, Numbers						
	1-11		received on 24.05.2005 with letter of 20.05.2005					
2.		th regard to the language, all the elements marked above were available or furnished to this Authority in the guage in which the international application was filed, unless otherwise indicated under this item.						
	The	These elements were available or furnished to this Authority in the following language: , which is:						
		the language of a tra	nslation furnished for the purposes of the international search (under Rule 23.1(b)).					
		the language of publi	cation of the international application (under Rule 48.3(b)).					
		the language of a tra Rule 55.2 and/or 55.3	nslation furnished for the purposes of international preliminary examination (under 3).					
3.		,	otide and/or amino acid sequence disclosed in the international application, the examination was carried out on the basis of the sequence listing:					
		contained in the inter	national application in written form.					
		filed together with the	e international application in computer readable form.					
		furnished subsequently to this Authority in written form.						
		furnished subsequently to this Authority in computer readable form.						
		The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.						
		The statement that the listing has been furn	ne information recorded in computer readable form is identical to the written sequence ished.					
4.	The	amendments have re	esulted in the cancellation of:					
		the description,	pages:					
		the claims,	Nos.:					
		the drawings,	sheets:					
5.	$\boxtimes$	This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).						
		(Any replacement sh report.)	neet containing such amendments must be referred to under item 1 and annexed to this					
		see separate sheet						

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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PCT/EP2004/050992

- 6. Additional observations, if necessary:
- V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- 1. Statement

Novelty (N)

Yes: Claims

No: Claims

1-11

Inventive step (IS)

Yes: Claims

No: Claims

1-11

Industrial applicability (IA)

Yes: Claims

1-11

No: Claims

2. Citations and explanations

see separate sheet

#### **Box I**

- 1. The following documents are referred to in the present report; the numbering will be adhered to the entire procedure
  - D1 EP-A-1172412
  - D2 EP-A-1045009
  - D3 US-A-5753733
- 1.1 This report has been established as if some of the amendments had not been made since they have been considered to go beyond the disclosure as filed (Rule 70.2 (c) PCT)

The amendment concerned is the replacement of "...alkyl group having 1 to 18 carbon atoms" by "...alkyl group having 1 to 6 carbon atoms" in claim 1 and on pages 3 and 4. The upper limit "6" of a subrange of the range of 1-18 carbon atoms is not disclosed in the application. Alkyl groups with 6 carbon atoms are only disclosed for n-hexyltrimethoxysilane. Other  $C_6$  alkylgroups like dimethylbutyl are not disclosed in the application. The generalisation from one member of  $C_6$  alkylgroups to all others is not allowable acc. Rule 70.2(c) PCT.

#### Box V

- 2. Present claims 1-11 appear not to be novel in the sense of Art. 33(2) PCT
- 2.1 Subject matter of claim 1 is a dispersion prepared from monomers (I) and (II) or (III). The claim is to be regarded as a product, the dispersion produced by a process of incorporating a mixture of monomers (I)-(III) into a polymer framework. All polymers comprising monomers (I)-(III) hence are novelty destroying regardless of their preparation
- 2.2.1 D1 discloses polymers containing acryl substituted siloxane monomers in table 1 and 4. However, the list for monomer C in paragraph [0079] also discloses vinyltrimethoxysilane (see also present claim 5). Selecting the monomer of the list of paragraph [0079] and replacing it for the acrylic monomers of table 1 discloses the present claim. Claim 1 hence still is novelty destroying.
- 2.2.2 Similarily, corresponding polymers are known from D2, reference example 1 in

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combination with paragraph [0023]

- 2.2.3 D3 discloses octyltriethoxysilane in example 1. However, column 4, line 30 of D3 also discloses vinyltrimethoxysilane
- 2.3 The subject matter of claims 2-11 is disclosed in each of D1, D2 or D3. Regarding claim 7, the applicant is reminded that also a monomer is regarded as "precursor stage". Nevertheless, if the applicant intended to direct the claim to a oligomeric or polymeric monomer, the claim would not be novel over D3, which includes (polymeric) PVOH in the dispersion
- 3. Present claims 1-11 appear not to be inventive in the sense of Art. 33(3) PCT
- 3.1 The problem to be solved by the present claims seems to prepare polymer dispersion leading to improved coatings. Since D1-D3 disclose the same dispersions, it can be expected that they likewise solve the problem. The present claims hence are not inventive

The present application does not present comparative examples showing a technical effect of the monomers chosen over other, like acrylic, monomers. A selection of specific monomers hence would lack an inventive step since they only solve the problem of preparing an alternative polymer of different monomers which are apparently suitable for the purpose of preparing the inventive polymers.





components of a physical mixture comprising

(i) at least one unsaturated silane of the general formula (I)

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$$[H_2C=CX(Y)_n]Si(CH_3)_p(R)_{3-p}$$
 (1),

in which X is a hydrogen atom or a methyl group, Y is a divalent -CH<sub>2</sub>-group, n is 0 or 1, R is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, and 2-methoxyethoxy, and p is 0 or 1,

and

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(ii) at least one organic silane of the general formula (II)

$$R^1Si(CH_3)_q(R^2)_{3-q}$$
 (II),

in which R<sup>1</sup> is a linear, branched or cyclic alkyl group having-1 to 6 carbon atoms or is an aryl group or is a polyether group, R<sup>2</sup> is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy and 2-methoxyethoxy, and q is 0 or 1,

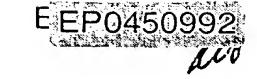
and/or at least one silicic ester of the general formula (III)

Si(
$$\mathbb{R}^3$$
)<sub>4</sub> (III),

in which groups R<sup>3</sup> are identical or different and R<sup>3</sup> is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy and isobutoxy,

are incorporated into the framework of the polymer.

The present invention further provides a process for preparing polymer dispersions



#### which involves

- mixing at least one monomer and components (i) and (ii),
- dispersing the resulting mixture in surfactant-containing water, and
- 5 then carrying out the polymerization.

The monomer, i.e. the precursor compound of the polymer framework, used in the process of the invention is preferably methyl methacrylate, butyl acrylate, butyl methacrylate, acrylic acid, vinyl alcohol, vinyl acetate or a mixture of at least two or more of the aforementioned monomers.

Furthermore, as component (i) it is preferred to employ vinyltrimethoxysilane, vinyltriethoxysilane, vinyltri(2-methoxyethoxy)silane, vinylmethyldimethoxysilane, vinylmethyldiethoxysilane or a mixture of two or more of the aforementioned silanes.

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In addition it is preferred as component (ii) to employ methyltrimethoxysilane, n-propyltrimethoxysilane, n-propyltriethoxysilane, n-propyltri(2-methoxyethoxy)silane, isobutyltrimethoxysilane, n-hexyltrimethoxysilane, phenyltrimethoxysilane, tetraethoxysilane, alkyl polyglycol propyltrimethoxysilane or a mixture of two or more of the aforementioned silanes.

Used additionally in the process of the invention is preferably from 0.1 to 10% by weight, in particular from 1 to 2% by weight, of unsaturated silane, based on the total amount of the monomers.

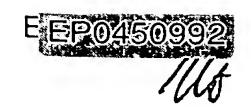
The weight ratio of components (i) and (ii) used in the process of the invention is

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#### What is claimed is:

- 1. A polymer dispersion wherein the components of a physical mixture comprising
- 5 (i) at least one unsaturated silane of the general formula (I)

$$[H_2C=CX(Y)_n]Si(CH_3)_p(R)_{3-p}$$
 (I),

in which X is a hydrogen atom or a methyl group, Y is a divalent -CH<sub>2</sub>-group, n is 0 or 1, R is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, and 2-methoxyethoxy, and p is 0 or 1,

and

(ii) at least one organosilane of the general formula (II)

$$R^1Si(CH_3)_q(R^2)_{3-q}$$
 (II),

in which R<sup>1</sup> is a linear, branched or cyclic alkyl group having 1 to 6 carbon atoms or is an aryl group or is a polyether group, R<sup>2</sup> is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy and 2-methoxyethoxy, and q is 0 or 1,

and/or at least one silicic ester of the general formula (III)

$$Si(R^3)_4$$
 (III),

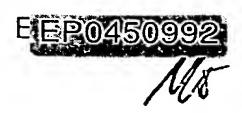
in which groups R<sup>3</sup> are identical or different and R<sup>3</sup> is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy and isobutoxy,

are incorporated into the framework of the polymer.

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- 2. A process for preparing a polymer dispersion as claimed in claim 1, which comprises
  - mixing at least one monomer and components (i) and (ii),
  - dispersing the mixture in surfactant-containing water, and
- then carrying out the polymerization.
- 3. A process as claimed in claim 2,

wherein

from 0.1 to 10% by weight of unsaturated silane (i) is used, based on the total amount of the monomers.

4. A process as claimed in claim 2 or 3,

wherein

component (i) is used in a weight ratio to component (ii) of from 99.9:0.1 to 0.1:99.9.

5. A process as claimed in any of claims 2 to 4,

wherein

an unsaturated silane selected from vinyltrimethoxysilane, vinyltri(2-methoxyethoxy)silane, vinylmethyldimethoxysilane, vinylmethyldimethoxysi

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6. A process as claimed in any of claims 2 to 5, wherein

an organosilane selected from methyltrimethoxysilane, n-propyltrimethoxysilane, n-propyltriethoxysilane, n-propyltri(2-methoxyethoxy)silane, isobutyltrimethoxysilane, isobutyltriethoxysilane, n-hexyltrimethoxysilane, phenyltrimethoxysilane, phenyltriethoxysilane, tetraethoxysilane, alkyl polyglycol





propyltrimethoxysilane or a mixture of two or more of the aforementioned silanes is used as component (ii).

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- 7. A process as claimed in any claims 2 to 6, wherein a precursor stage of a polymer selected from polyacrylates, polymethacrylates, polystyrene acrylates, polyvinyl alcohols, and polyvinyl acetates is used as monomer.
- 8. A polymer dispersion obtainable as claimed in any of claims 2 to 7.
- 9. The use of a physical mixture of components (i) and (ii) as claimed in claim 1 for preparing a polymer dispersion.
  - 10. The use of a polymer dispersion as claimed in any of claims 1 to 8 in a concrete primer, in an adhesive or sealant or in an ink or paint.
- 11. An article prepared using a polymer dispersion as claimed in any of claims 1 to 10.